

**BREAKOUT SESSION: INTEGRATING PENICILLIN ALLERGY ASSESSMENTS
INTO YOUR PRACTICE**

PERIOPERATIVE & OBSTETRICS CURRICULUM



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Case 1A: Perioperative: Penicillin Allergy Label and Intraoperative Anaphylaxis

Narrative vignette

A patient with a documented penicillin allergy label is undergoing an elective surgical procedure. Shortly after induction, the patient develops hypotension, tachycardia, and diffuse flushing. The surgical and anesthesia teams pause the case and page allergy both for managing the acute event and on identifying the likely culprit agent, given that multiple drugs (antibiotic, neuromuscular blocking agent, chlorhexidine, latex) were administered around the same time.

Background literature & evidence

- Perioperative anaphylaxis is rare (estimated 1 in 10,000 surgical procedures) with recent data suggesting the incidence to be 1 in 6,531 procedures, with 5% near fatal and 2% fatal cases; antibiotics, neuromuscular blocking agents (NMBA), sugammadex, chlorhexidine and latex are the most common identifiable causes, with beta-lactams responsible for the majority of antibiotic-related cases. (PMID: [35769557](#), PMID: [34330411](#))
- A national US analysis found antibiotics (predominantly beta-lactams) to be an important and likely under-recognized identifiable cause of perioperative anaphylaxis, reinforcing the need for a structured post-event allergy workup rather than assuming a single default culprit. (PMID: [31154032](#))
- Cross-reactivity between penicillins and cephalosporins is minimal (on the order of 1–2%, largely sidechain rather than core beta-lactam ring driven) (PMID: [30644987](#)).
- Multiple studies have looked at the implementation of first-line cefazolin use in patients with a penicillin allergy, with a variety of interventions, including use of patient risk stratification questionnaires and use of clinicians' algorithms to guide antibiotic selection intraoperatively. All have shown safe use of cefazolin utilization without an increase in adverse events. (PMID: [38391543](#), PMID: [30644987](#))
- A structured perioperative antimicrobial stewardship intervention addressing penicillin allergy labels improved appropriate prescribing, demonstrating that operationalized workflows and not just knowledge can change practice. (PMID: [34396943](#))

Points for discussion

- How can an allergist meaningfully contribute in the acute intraoperative setting versus in a postoperative workup 4-6 weeks later in the outpatient allergy clinic?
- How should the differential diagnosis of intraoperative anaphylaxis (antibiotic, NMBA, chlorhexidine, latex, dyes) shape the immediate response and the sequence of post-event testing?
- For non-allergist team members (surgery, anesthesia) managing the individual: what would help them feel confident giving cefazolin as pre-op antibiotic prophylaxis to a penicillin-allergy labeled patient before a procedure?

Case 1B: Perioperative: Piperacillin-Tazobactam Anaphylaxis with Negative Skin Testing and Positive Intravenous Challenge

Narrative vignette

A 34-year-old woman was referred by an outside allergist for evaluation of suspected perioperative anaphylaxis after an urgent cholecystectomy attempt. She had presented cholestasis and received piperacillin-tazobactam in the preoperative holding area (14:15). Shortly after induction (14:31) with multiple agents (see below), a rash around the neck became increasingly apparent, followed by facial, lip, oral, and tongue angioedema and hypotension. Epinephrine was administered at approximately 14:33, and the procedure was canceled. No acute serum tryptase level was obtained.

Perioperative Exposure Timeline

Time (hrs.)	Agent	Event
14:15	Piperacillin-tazobactam	
14:22	Rocuronium, dexamethasone	
14:25	Fentanyl	
14:30	Propofol	
14:32		Neck rash, lip angioedema
14:33	Epinephrine	Hypotension

Clinical Context

The cholecystectomy was completed the following day while the patient remained intubated, but the medications and other exposures used during the second procedure were unavailable. She was extubated on the third day and subsequently discharged. She had previously tolerated general anesthesia for three cesarean sections, a dilation and curettage, and a gastric sleeve procedure.

Additional Allergy History

She also described a 2- to 3-month history of recurrent pinpoint urticaria triggered by hot showers and relieved by lukewarm water. Symptoms were not controlled with cetirizine 20 mg, and she did not report chronic urticaria before the perioperative episode. This was assessed as chronic inducible/cholinergic urticaria.

Diagnostic Evaluation and Drug Challenges

- serum specific IgE to latex, penicillin G, and amoxicillin was negative; baseline serum tryptase was 3.2 ng/mL one year after index reaction.
- skin testing was negative to penicilloyl polylysine, penicillin G, piperacillin-tazobactam, atracurium, cisatracurium, rocuronium, succinylcholine, vecuronium, chlorhexidine, povidone iodine, fentanyl, and propofol.

- open graded 3-step IV piperacillin-tazobactam challenge was positive. At the end of the final dose, she developed urticaria on the back and left arm without other reported symptoms; she received an antihistamine and one dose of epinephrine, with improvement.
- open graded amoxicillin challenge was negative; she developed subjective pruritus only.
- open graded cefdinir challenge was negative after 30 mg and 300 mg doses.

Assessment and Current Recommendations

- The evaluation supports piperacillin-tazobactam as the likely culprit despite negative skin testing. Continue to avoid piperacillin-tazobactam and use equally efficacious alternatives (i.e., cefazolin).
- Amoxicillin and cefdinir were tolerated during supervised challenges and may be used as documented tolerated alternatives.
- Rocuronium, fentanyl, and propofol may be administered as clinically indicated.
- Chronic inducible/cholinergic urticaria remained uncontrolled and may complicate interpretation of isolated cutaneous symptoms.

Points for discussion

- How should the differential diagnosis of intraoperative anaphylaxis (antibiotic, NMBA, chlorhexidine, latex, dyes) shape the immediate response and the sequence of post-event testing?
- What hidden allergens should always be included in the evaluation of perioperative anaphylaxis?
- What is the approach when your initial perioperative anaphylaxis evaluation is negative (usually skin testing to suspected causal agents)?

Case 2: OBGYN: Navigating Penicillin Allergy Labels in Pregnancy

Pregnancy raises the stakes of an unresolved penicillin allergy label: some indications (like GBS prophylaxis) have effective alternatives, while others (like syphilis) do not.

Case 2A: Obstetrics — Navigating a Penicillin Allergy Label across Pregnancy (Group B Streptococcus)

Narrative vignette

A patient at 12 weeks' gestation is found to be Group B Streptococcus (GBS) colonized and carries a penicillin allergy label from a childhood rash. Walk through the decision points as the pregnancy progresses: whether and when to pursue formal evaluation, how the recommendation might change by trimester, and what happens if none of this is addressed and she later presents for an urgent, unplanned cesarean section with the allergy label still unresolved.

Background literature & evidence

- Almost 8-13% of pregnant patients report a penicillin allergy. The use of alternative antibiotics has been associated with increased cesarean delivery, endometritis, wound and neonatal complications (e.g. GBS sepsis) alongside increased antibiotic resistance, toxicity and healthcare costs. (PMID: [39490659](#))
- A systematic review of antenatal penicillin allergy evaluation across multiple studies reported it to be safe, effective, and generally well-accepted by pregnant patients, with allergy-related adverse events rare, mild, and transient, and no reported adverse antenatal outcomes across studies. (PMID: [40886786](#))
- In a cohort of pregnant patients referred for penicillin allergy e-consultation, those who completed in-person evaluation had markedly reduced peripartum vancomycin, clindamycin, and gentamicin use, and 18-fold higher odds of receiving first-line penicillin with 95% of skin-tested patients safely delabeled and no adverse antenatal outcomes. Furthermore, first-line GBS prophylaxis with penicillin and cefazolin (for C-section) was higher in patients who completed the entire consultation. (PMID: [33212237](#))
- Testing outcomes did not differ based on trimesters of pregnancy, supporting the feasibility of evaluation whenever a patient is identified rather than deferring based on gestational age alone. (PMID: [40528937](#))
- Penicillin remains first-line for GBS intrapartum prophylaxis; unresolved penicillin allergy labels commonly push patients toward less effective second-line agents (clindamycin, vancomycin), which carry higher rates of resistance and reduced efficacy against GBS. The practice of penicillin allergy should be universal and American College of Obstetricians and Gynecologists have encouraged to expand the use of penicillin skin testing during pregnancy. (PMID: [39490659](#), PMID: [32005632](#))
- More recently, groups have been performing direct oral challenges (e.g. no skin testing) for delabeling penicillin allergies with low-risk histories. (PMID: [35398550](#), PMID: [39254054](#))

Points for discussion

- At what point in pregnancy should evaluation be offered, and does timing change the recommendation or mainly just the planning runway?
- What's the practical, patient-facing rationale for why testing is safe in pregnancy, for allergists fielding questions from OB colleagues or anxious patients?
- What are the logistics barriers (referral pathway, scheduling, patient no-shows) that most commonly prevent evaluation from being completed — what has worked to close that gap?
- If nothing was addressed antenatally and the patient now needs an urgent cesarean section, what are the realistic options at that point?

Case 2B: Obstetrics — Pregnant Patient with Syphilis and Penicillin Allergy

Narrative vignette

A 29-year-old pregnant woman (G2P1) at 18 weeks' gestation presents for routine prenatal care and is asymptomatic.

Initial Evaluation

- RPR: Reactive (titer 1:32)
- Confirmatory treponemal test: Positive
- HIV: Negative
- Ultrasound: Appropriate fetal growth

Allergy History

She reports a penicillin allergy 4 years ago after IV penicillin G:

- Immediate onset diffuse urticaria

Clinical Question

Penicillin is the only effective therapy for syphilis in pregnancy. The obstetrician asks you: how can you give penicillin?

Teaching Points

- Syphilis in pregnancy is a medical emergency.
- When the history is consistent with IgE-mediated penicillin allergy, we could perform a desensitization, but skin testing would also be an appropriate next step given the reaction was cutaneous as described (diffuse hives).
- If we skin test, we should use all available reagents (PrePen, penicillin G, ampicillin), as we want to maximize sensitivity.
- The 1:1:1 criterion in penicillin allergy could be useful here for risk determination. Patients with an urticarial eruption that appeared within 1 hour after the first dose and regressed within 1 day commonly had their penicillin allergy confirmed. The 1-1-1 criterion displayed

a sensitivity and specificity of 85%, and a negative predictive value and a positive predictive value of 80% and 90%, respectively.